

## CLAIMS

What is claimed is:

- 5 1. A semiconductor optical system, comprising  
an edge-emitting, stripe-waveguide semiconductor chip having a first tilted facet  
and second tilted facet located at either end of the stripe, the chip generating a  
lowest order spatial mode that is greater than 5 micrometers in diameter;  
a first fiber pigtail having an endface positioned opposite the first tilted facet; and  
a second fiber pigtail having an endface positioned opposite the second tilted facet.
- 10 2. A semiconductor optical system as claimed in claim 1, wherein the first tilted facet  
and the second tilted facet are angled relative to an axis of the stripe to prevent self  
oscillation of the semiconductor chip.
- 15 3. A semiconductor optical system as claimed in claim 1, wherein the first tilted facet  
and the second tilted facet are angled relative to an axis of the stripe by less than 5  
degrees.
- 20 4. A semiconductor optical system as claimed in claim 1, wherein the first tilted facet  
and the second tilted facet are angled relative to an axis of the stripe by about than 4  
degrees.
5. A semiconductor optical system as claimed in claim 1, wherein the first fiber pigtail  
and the second fiber pigtail are single mode optical fiber.
- 25 6. A semiconductor optical system as claimed in claim 1, wherein the first fiber pigtail  
and the second fiber pigtail function as spatial mode filters controlling the distribution  
of power among the multiple spatial modes of the semiconductor chip.
7. A semiconductor optical system as claimed in claim 1, wherein the endfaces of the  
first fiber pigtail and the second fiber pigtail are butt coupled to the first tilted facet and  
the second tilted facet, respectively.

8. A semiconductor optical system as claimed in claim 1, wherein a length of the stripe is greater than 5 millimeters.

9. A semiconductor optical system as claimed in claim 1, wherein a length of the stripe is greater than 10 millimeters.

10. A semiconductor optical system as claimed in claim 1, wherein a length of the stripe is greater than 20 millimeters.

11. A semiconductor optical system as claimed in claim 1, wherein lowest order spatial mode that is greater than 6 micrometers in diameter.

12. A semiconductor optical system as claimed in claim 1, wherein lowest order spatial mode that is greater than 9 micrometers in diameter.

13. A semiconductor optical system as claimed in claim 1, wherein first tilted facet and second tilted facet are anti-reflection coated.

14. A semiconductor optical system as claimed in claim 1, wherein the edge-emitting stripe waveguide semiconductor chip is overmoded.

15. A semiconductor optical system as claimed in claim 1, wherein the first fiber pigtail includes a Bragg grating that functions as an output mirror.

16. A semiconductor optical system as claimed in claim 15, wherein the second fiber pigtail includes a reflector functioning as a laser cavity back reflector.

17. A semiconductor optical system, comprising  
an edge-emitting, stripe-waveguide semiconductor chip having a tilted front facet  
and a highly reflecting back facet, the chip generating a lowest order spatial  
mode that is greater than 5 micrometers in diameter;  
an output mirror through which a laser output beam is coupled; and

a spatial mode filter, between the output mirror and the front facet of the chip, that preferentially distributes the power into the large, lowest order mode of the semiconductor chip.

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18. A semiconductor optical system as claimed in claim 17, wherein the tilted front facet is angled relative to an axis of the stripe to prevent self-oscillation of the semiconductor chip.

19. A semiconductor optical system as claimed in claim 17, wherein the tilted front facet is angled relative to an axis of the stripe by less than 4 degrees.

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20. A semiconductor optical system as claimed in claim 17, wherein the spatial mode filter is a single mode optical fiber and the output mirror is a fiber Bragg grating.

21. A semiconductor optical system as claimed in claim 17, wherein a length of the stripe is greater than 10 millimeters.

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